WHAT IS CLAIMED IS:

1. A method for fabricating a semiconductor device comprising:

the step of forming gate electrodes respectively in a first element region and in a second element region which are formed over a semiconductor substrate, with a gate insulation film formed therebetween;

the step of forming a first resist film over the semiconductor substrate and the gate electrodes, the first resist film being opened in the first element region;

the step of implanting a dopant in the first element region with the first resist film and the gate electrodes as a mask to form a first dopant diffused region;

the first ashing processing step of ashing the first resist film;

the step of forming a sidewall insulation film over the side wall of the gate electrode;

the step of forming a second resist film over the semiconductor substrate, the gate electrode and the sidewall insulation film, the second resist film being opened in the second element region;

the step of implanting a dopant in the first element region with the second resist film, the gate electrode and the sidewall insulation film as a mask to form a second dopant diffused region; and

the second ashing processing step of ashing the second resist film,

an ashing processing period of time in the first ashing processing step being shorter than an ashing processing period of time in the second ashing processing step.

2. A method for fabricating a semiconductor device according to claim 1, wherein

the ashing processing period of time in the first ashing processing step is below 0.7 times the ashing processing period of time in the second ashing processing step.

3. A method for fabricating a semiconductor device according to claim 2, wherein

the ashing processing period of time in the first ashing processing step is below 0.5 times the ashing processing period of time in the second ashing processing step.

4. A method for fabricating a semiconductor device comprising:

the step of forming gate electrodes respectively in a first element region and in a second element region which are formed over a semiconductor substrate, with a gate insulation film formed therebetween;

the step of forming a first resist film over the semiconductor substrate and the gate electrodes, the first resist film being opened in the first element region;

the step of implanting a dopant in the first element region with the first resist film and the gate electrodes as a mask

to form a first dopant diffused region;

the first ashing processing step of ashing the first resist film with a reaction gas of oxygen;

the step of forming a sidewall insulation film over the side wall of the gate electrode;

the step of forming a second resist film over the semiconductor substrate, the gate electrode and the sidewall insulation film, the second resist film being opened in the second element region;

the step of implanting a dopant in the first element region with the second resist film, the gate electrode and the sidewall insulation film as a mask to form a second dopant diffused region; and

the second ashing processing step of ashing the second resist film with a mixed gas mixing a reaction gas of oxygen and another reaction gas.

5. A method for fabricating a semiconductor device according to claim 4, wherein

said another reaction gas is a gas containing a fluorine atom and a hydrogen atom.

6. A method for fabricating a semiconductor device according to claim 4, wherein

the mixed gas further contains a foaming gas.

7. A method for fabricating a semiconductor device comprising:

the step of forming gate electrodes respectively in a first

element region and in a second element region which are formed over a semiconductor substrate, with a gate insulation film formed therebetween;

the step of forming a first resist film over the semiconductor substrate and the gate electrodes, the first resist film being opened in the first element region;

the step of implanting a dopant in the first element region with the first resist film and the gate electrodes as a mask to form a first dopant diffused region;

the first ashing processing step of ashing the first resist film;

the first chemical processing step of removing the first resist film with a chemical liquid;

the step of forming a sidewall insulation film over the side wall of the gate electrode;

the step of forming a second resist film over the semiconductor substrate, the gate electrode and the sidewall insulation film, the second resist film being opened in the first element region;

the step of implanting a dopant in the first element region with the second resist film, the gate electrode and the sidewall insulation film as a mask to form a second dopant diffused region;

the second ashing processing step of ashing the second resist film; and

the second chemical processing step of removing the second resist film with a chemical liquid,

a chemical liquid processing period of time in the first chemical liquid processing step being shorter than a chemical liquid processing period of time in the second chemical liquid processing step.

8. A method for fabricating a semiconductor device according to claim 7, wherein

the chemical liquid processing period of time in the first chemical liquid processing step is below 0.7 times the chemical liquid processing period of time in the second chemical liquid processing step.

9. A method for fabricating a semiconductor device according to claim 8, wherein

the chemical liquid processing period of time in the first chemical liquid processing step is below 0.5 times the chemical liquid processing period of time in the second chemical liquid processing step.

10. A method for fabricating a semiconductor device according to claim 7, wherein

in the first chemical liquid processing step, the first resist film is removed with a chemical liquid mixing ammonia, hydrogen peroxide and water; and

in the second chemical liquid processing step, the second resist film is removed with a chemical liquid mixing ammonia, hydrogen peroxide and water.

11. A method for fabricating a semiconductor device according to claim 7, further comprising:

the third chemical liquid processing step of removing the first resist film with a chemical liquid mixing sulfuric acid and hydrogen peroxide after the first ashing processing step and before the first chemical liquid processing step; and

the fourth chemical liquid processing step of removing the second resist film with a chemical liquid mixing sulfuric acid and hydrogen peroxide after the second ashing processing step and before the second chemical liquid processing step.

12. A method for fabricating a semiconductor device comprising:

the step of forming a gate electrode over a semiconductor substrate with a gate insulation film formed therebetween;

the step of implanting a dopant in the semiconductor substrate with the gate electrode with a mask to form a first dopant diffused region in the semiconductor substrate on both sides of the gate electrode;

the first cleaning processing step of cleaning the substrate with a chemical liquid;

the first thermal processing step of performing thermal processing to activate the dopant in the first dopant in the first dopant diffused region;

the step of forming a sidewall insulation film over the side wall of the gate electrode;

the step of implanting a second dopant in the semiconductor substrate with the gate electrode and the sidewall insulation film as a mask to form a second dopant diffused region;

the second cleaning processing step of cleaning the semiconductor substrate with a chemical liquid; and

the second thermal processing step of performing thermal processing for activating the second dopant in the second dopant diffused region,

a cleaning processing period of time in the first cleaning processing step being shorter than a cleaning processing period of time in the second cleaning processing step.

13. A method for fabricating a semiconductor device according to claim 12, wherein

the cleaning processing period of time in the first cleaning processing step is below 0.7 times the cleaning processing period of time in the second cleaning processing step.

14. A method for fabricating a semiconductor device according to claim 13, wherein

the cleaning processing period of time in the first cleaning processing step is below 0.5 times the cleaning processing period of time in the second cleaning processing step.

15. A method for fabricating a semiconductor device according to claim 12, wherein

the semiconductor substrate is cleaned with a chemical liquid mixing ammonia, hydrogen peroxide and water respectively in the first cleaning processing step and the second cleaning processing step.

16. A method for fabricating a semiconductor device according to claim 12, further comprising:

the third cleaning processing step of cleaning the semiconductor substrate with a chemical liquid mixing hydrochloric acid, hydrogen peroxide and water, after the step of forming a first dopant diffused region and before the first cleaning processing step, or after the first cleaning processing step and before the first thermal processing step; and

the fourth cleaning processing step of cleaning the semiconductor substrate with a chemical liquid mixing hydrochloric acid, hydrogen peroxide and water, after the step of forming a second dopant diffused region and before the second cleaning processing step, or after the second cleaning processing step and before the second thermal processing step.